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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Yasushi Hayashi

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EXAMINER

BAYOU, AMENE SETEGNE

ART UNIT

PAPER NUMBER

3746

MAIL DATE

DELIVERY MODE

12/06/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/552,532	Applicant(s) HAYASHI, YASUSHI	
	Examiner AMENE S. BAYOU	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/23/10.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01/28/10 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 11/23/10 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

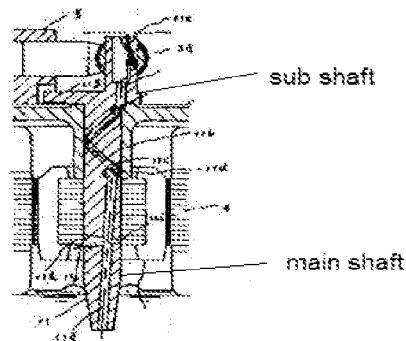
3. Claims 1- 12 are rejected under 35 U.S.C. 103(a) as being as being unpatentable over Nobuo et al. (Japanese patent publication number S62-44108) in view of Goodnight (6457561) further in view of Choi (5971724) and Stocklein et al. (2996240).

4. In re claim 1, 11 and 12 Nobuo et al. disclose lubrication system for hermetic compressor including:

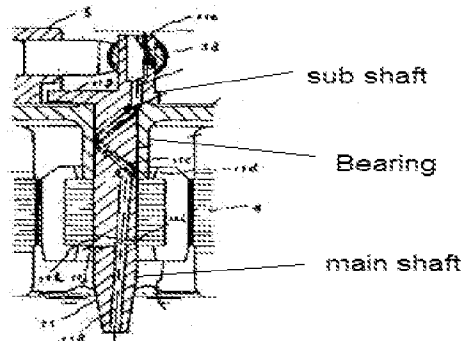
- **Electric compressor ,in figure 1 and 2 ,comprising :a single phase induction motor (4) formed of stator and rotor**

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- A **compressing mechanism (5)** driven by the **motor (4)**
- A **hermetic container (2)** for accommodating the motor (4) and the compressing mechanism (2) and for pooling **lubricant (7)**
- A shaft having a main shaft and sub shaft (shown below)



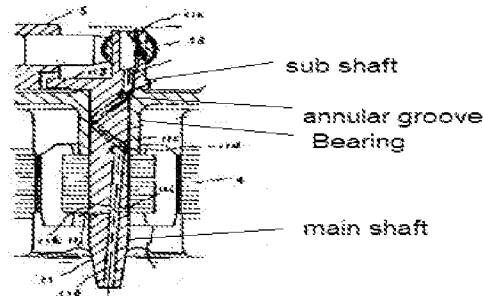
- A **cylinder (5)** for forming a compressing chamber
- A bearing (shown below) for supporting the main shaft



- A **centrifugal pump (11)** opening into **the lubricant (7)**
- A **forward leading groove (11c)** engraved on an outer wall of the main shaft and having a first end communicating with the centrifugal pump

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(11a), and a **second end of the forward leading groove (11c)** opening to the annular lubricant groove.



- A **vertical hole (11f)** bored in the sub shaft and having a first end communicating with the annular lubricant groove and a second end opening into the hermetic container. Nobuo et al., however fail to disclose the specific details of the shaft including a reverse leading groove. But Goodnight teaches a similar compressor lubrication apparatus including a main shaft comprising a **first section (32)** having a first diameter and a **second section (46)** having a second diameter smaller than the first diameter; **reverse leading groove (44)** having a lead directing in an opposite direction to that of the **forward leading groove (42)**, and having a first end communicating with the **centrifugal pump (26)**, in **figure 7-9, 14 and columns 3, line 39-50 and column 7, lines 7-11**. Nobuo et al. in view of Goodnight, However fail to disclose the specific location of the leading groove on the shaft. But Choi teaches a hermetic compressor and lubrication method including a **Leading groove (12)** having a first end within the second section of the shaft (i.e. the smaller diameter portion of

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the shaft), clearly shown in **figure 2 and 4**. Nobuo et al. in view of Goodnight and Choi fail to disclose an annular lubricant groove and its associated details. But Stocklein et al teach a compressor comprising an **annular lubricant groove (b; figure 2)** having an **inner rim** and an **outer rim**; the **bearing (6)** defining in part the outer rim of the **annular lubricant groove (b; figure 2)**, wherein the **shaft (7)** includes a **circumferential notch (clearly shown in figure 2 and is reproduced in the annotated drawing below)** defining in part an **inner rim** of the **lubricant groove (b; figure 2)**, the circumferential notch having a lower axial surface (see annotated drawing), the **vertical hole (g)** communicating with the **outer rim** of the **annular lubricant groove (b; figure 2)**; wherein the **forward leading groove (15a)**, **annular lubricant groove (b; figure 2)** and the **vertical hole (g)** define a lubricant pathway such that the lubricant passes from the annular lubricant groove to the vertical hole.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the compressor of Nobuo et al. by adding a reverse leading groove as taught Goodnight in order to ensure lubrication during reverse rotation of the compressor. Also since Nobuo et al. already disclosed forward leading groove having a first end communicating with the centrifugal pump and a second end communicating with an annular lubricant groove making the reverse leading groove second end communicating with an annular lubricant groove is a mere duplication. In addition It would have been obvious to one skilled in the art at the time the invention was made to have

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located the first end of the modified reverse leading edge of Nobuo et al in the smaller diameter section of the shaft as taught by Choi since the outer area of the smaller diameter section of the shaft serves as an oil accumulator which facilitates pumping action. Please also note that Goodnight, in column 6, lines 17-20 teaches that the origin of the forward and reverse grooves can be at different locations and selecting the origin point would be obvious to one skilled in the art since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70. Finally it would have been obvious to one skilled in the art at the time the invention was made to have modified the modified annular lubricant groove of Nobuo et al., by making it to have an inner rim and an outer rim as taught by Stocklein et al since the area defined between the outer and inner rim serve as an oil buffer or reservoir for effective lubrication of the upper bearing area. As shown in figure 3a and the annotated drawing above, Stocklein et al 's forward leading groove communicates with the lower axial surface of the circumferential notch via the groove "a" which is engraved inside the bearing surface. But as discussed above since Nobuo et al. already disclosed forward leading groove having a second end communicating with an annular lubricant groove making such groove on the shaft instead of the bearing itself would be obvious to the skilled in the art since it is directed to same purpose .And making the reverse leading groove extending to and opening at the lower axial surface of the circumferential notch would also be a mere duplication as outlined above. Finally please note that once modified the forward leading groove of Goodnight

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will directly be in communication with the area defined by the outer and inner rim of the annular lubricant groove. And since as stated above both the forward and reverse grooves are made to communicate with the inner rim of the lubricant groove, it follows that the limitations of claims 11 and 12 “to limit the flow of lubricant into the reverse (or forward) groove when the motor rotates in forward (or reverse) direction are inherently met since these functional limitation are the result of the specific groove configuration defined by the modification.

In re claim 2 Nobuo et al. in view of Goodnight further in view of Choi and Stocklein et al as applied to claim 1 disclose the claimed invention:

Goodnight discloses:

- The **reverse leading groove (44)** is formed at the intermediate section of the shaft, in **figure 6**.

In re claims 3 and 6 Nobuo et al. in view of Goodnight further in view of Choi and Stocklein et al as applied to claim 1 disclose the claimed invention:

Goodnight discloses:

- Crossectional area of the reverse leading groove is smaller than that of the forward leading groove, in **column 7, lines 10-11 and line 35-38**. Please note that such choice of different areas would be an obvious design choice in order to vary the flow rate in the forward and reverse leading grooves.

In re claims 4, 7 and 9 Nobuo et al. in view of Goodnight further in view of Choi and Stocklein et al as applied to claim 1 disclose the claimed invention:

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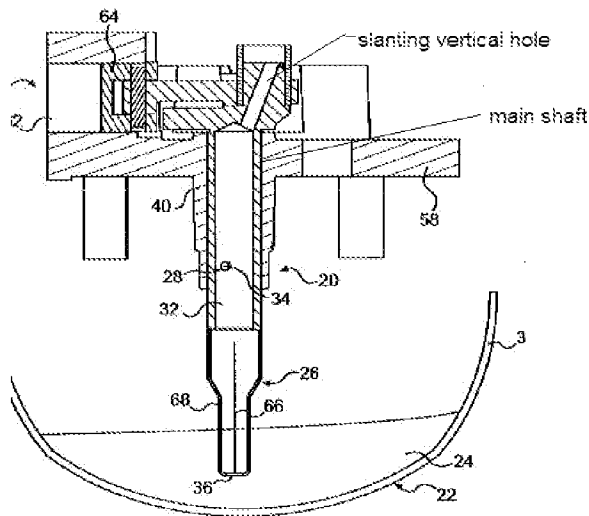
Goodnight discloses:

- Lead of the reverse leading groove is greater than that of the forward leading groove in **column 7, lines 10-11 and line 35-38**. Please note that the angle of the reverse (or forward) leading groove with respect to a plane perpendicular to an axis of the main shaft is interchangeable with the Lead. In addition it would have been obvious to one skilled in the art at the time the invention was made to make the angle of the reverse leading groove to be larger than that of the forward groove simply because the lubricant oil has to go up the hill in the forward leading groove (thus it has to be small to ensure proper flow) while the lubricant oil is assisted by gravity in the reverse rotation and thus to utilize the gravity effect the groove should as much as possible be going close to 90 degree still making sure that the flow remains in the groove.

In re claim 5 Nobuo et al. in view of Goodnight further in view of Choi and Stocklein et al as applied to claim 1 disclose the claimed invention:

Goodnight discloses:

- A vertical hole slants with respect to a shaft center of the main shaft such that an upper section of the vertical hole slants outward, in figure 2.



In re claim 8 Nobuo et al. in view of Goodnight further in view of Choi and Stocklein et al as applied to claim 1 disclose the claimed invention:

Stocklein et al disclose:

- An entire rounding section of the upper end of the **bearing (6)** is chamfered (clearly shown in figure 2) and the annular lubricant groove is formed between the chamfered section and the main shaft **(7)**.

In re claim 10 Nobuo et al. in view of Goodnight further in view of Choi and Stocklein et al as applied to claim 1 disclose the claimed invention since Goodnight as detailed above teaches a reverse leading groove and the and Stocklein et al teach 's annular lubricant groove (b; figure 2) and the vertical hole (g) define a lubricant pathway such that the lubricant passes from the annular lubricant groove to the vertical hole .Once modified the path from the

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reverse leading groove to the annular lubricant groove forms a continuous lubrication path.

Response to Arguments

5. Applicant's arguments with respect to claims 1 -9, filed on November 23, 2010 are fully considered but are not found persuasive.

6. On page 3, paragraphs 3 and 4 applicants argued that Stocklein fails to teach the newly amended claim limitation "the shaft includes a circumferential notch defining in part the inner rim of the annular lubricant groove, the circumferential notch having a lower axial surface and a forward leading groove ..extending to and opening at the lower axial surface of the circumferential notch". In the claim rejection section above examiner, using annotated drawing provided a detailed discussion how this amended feature is taught by Stocklein and repeating the same will be redundant.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amene S. Bayou whose telephone number is 571-270-3214. The examiner can normally be reached on Monday-Thursday, 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Amene S Bayou/
Examiner, Art Unit 3746